CLAIMS

1. A microporous material which comprises a positively charged framework comprising a silicophosphate structure.

2. A microporous material as claimed in claim 1 having a framework density in the range of 12.5 to 20.5.

3. The use of a microporous material which comprises a positively charged framework comprising a silicophosphate structure as an anion exchange material.

4. The use as claimed in claim 3 which comprises the treatment of waste materials in effluent streams.

5. The use as claimed in claim 4 which comprises the removal of undesirable anion species from solutions in the nuclear power industry.

6. The use as claimed in claim 5 wherein the anion species comprises pertechnetate anions.

7. A silicophosphate for use as an anion exchange material.

8. An anion exchange material which comprises a silicophosphate.

9. A method for the synthesis of a microporous material which comprises a positively charged framework, wherein said microporous material comprises a silicophosphate, said method comprising:

   (a) providing a two-phase system comprising:

      (i) an organic phase comprising an organosilicon compound;

(ii) an aqueous phase comprising a phosphoric acid;
(iii) a phase transfer agent;
(iv) a structure directing agent; and
(v) a buffering agent;

(b) stirring and facilitating reaction between the reactants; and

(c) isolating the product.

10. A method as claimed in claim 9 wherein said organic phase comprises an alcoholic phase.

11. A method as claimed in claim 10 wherein said alcoholic phase comprises t-butanol or isoamyl alcohol.

12. A method as claimed in any one of claims 9, 10 or 11 wherein said organosilicon compound contains a labile group capable of reaction with phosphoric acid.

13. A method as claimed in claim 12 wherein said organosilicon compound comprises a tetramethylsilyl halide.

14. A method as claimed in claim 13 wherein said tetramethylsilyl halide comprises tetramethylsilyl chloride or tetramethylsilyl bromide.

15. A method as claimed in any one of claims 9 to 14 wherein said phosphoric acid comprises metaphosphoric acid or polyphosphoric acid.

16. A method as claimed in any one of claims 9 to 15 wherein said phase transfer agent comprises an organic sulphonate salt.

17. A method as claimed in claim 16 wherein said organic sulphonate salt comprises a toluene-4-sulphonate salt.

18. A method as claimed in claim 17 wherein said toluene-4-sulphonate salt comprises sodium toluene-4-sulphonate.

19. A method as claimed in any one of claims 9 to 18 wherein said structure directing agent comprises cations.

20. A method as claimed in claim 19 wherein said cations comprise tetraalkyl ammonium cations.

21. A method as claimed in claim 19 or 20 wherein said structure directing agent comprises tetraethyl ammonium chloride or tetraethyl ammonium bromide.

22. A method as claimed in any one of claims 9 to 21 wherein said buffering agent comprises an ammonium salt.

23. A method as claimed in claim 22 wherein said ammonium salt comprises ammonium acetate.

24. A method as claimed in any one of claims 9 to 23 which proceeds at a temperature of between 0° and 100°C.

25. A method as claimed in claim 24 which proceeds at a temperature of between 20° and 70°C.

26. A method as claimed in claim 25 which proceeds at a temperature of between 40° and 60°C.

27. A method as claimed in any one of claims 9 to 26 which proceeds for a duration of between 30 minutes and 12 hours.

28. A method as claimed in claim 27 which proceeds for a duration of between 2 and 10 hours.

29. A method as claimed in claim 28 which proceeds for a duration of between 6 and 8 hours.

30. A method as claimed in any one of claims 9 to 29 wherein the microporous material is isolated from the reaction mixture by filtration.